The California CABG Outcomes Reporting Program (CCORP)

Data Abstractor Training Handbook

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California Office of Statewide Health Planning and Development

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Table of Contents

Section One: Introduction

Section Two: Data Elements and Definitions

Section Three: Quizzes

Section Four: Patient Vignettes and Answers

Section One:
Introduction

An Introduction to the
California CABG Outcomes Reporting Program (CCORP)

What is the Office of Statewide Health Planning and Development?

The Office of Statewide Health Planning and Development (OSHPD) is a department of the California Health and Human Services Agency. OSHPD is responsible for providing timely, accurate and actionable information on California's health care system.

An Overview of CCORP

Since 1996, OSHPD has been collaborating with the Pacific Business Group on Health (PBGH) to report risk-adjusted mortality for Californians undergoing CABG surgery. This voluntary reporting program includes over 80 of the 120 hospitals performing adult coronary bypass surgeries. In October of 2001, Gov. Davis signed Senate Bill (SB) 680 (Figueroa) into law. SB 680 establishes a mandatory CABG reporting program for hospitals and requires OSHPD to report mortality rates for individual surgeons as well as hospitals. Both the California Medical Association and the American College of Cardiology were sponsors of this important legislation.

The new California CABG Outcomes Reporting Program (CCORP) is designed to collect and report CABG operative mortality for all California hospitals and surgeons that perform the CABG procedure. Other features of CCORP include the creation of a clinical advisory panel to advise OSHPD on risk adjustment, an audit program to ensure that data submitted by hospitals are complete and accurate, and an appeals process that allows surgeons to challenge their ratings. The program will produce uniform hospital and surgeon-level mortality data, adjusted to account for differences across hospitals in the mix of patients undergoing isolated CABG procedures.

CCORP will provide comparative information to:

- **Hospitals and surgeons**, to stimulate and facilitate quality improvements at individual institutions;
- **Purchasers of Care**, to assess provider performance and make quality-based purchasing decisions;
- **Consumers**, to make informed treatment decisions.

CCORP will collect pre-operative risk factors (e.g., priority status of procedure, age, left ventricular ejection fraction), process of care or operative factors (e.g., IMA used as grafts), and in-hospital surgical mortality associated with the CABG surgery. We will analyze the data and report on risk-adjusted mortality rates at the hospital level annually and the surgeon level biannually.

To facilitate data collection, CCORP incorporates many data elements drawn from the National Society of Thoracic Surgeons (STS) cardiac reporting system. In addition, CCORP collects some data elements that STS does not collect (e.g., hepatic failure) or that are modified in important ways from STS definitions (e.g., Left Main Disease -%). Provided that data are submitted according to the format and values specified for each data element by OSHPD, hospitals may use

approved STS vendor software, the CCORP tool, or an in-house system for data collection. For hospitals that request it, OSHPD will supply, free of charge, the CCORP data collection tool (data entry software).

Background and Development

OSHPD strives to ensure that CABG data reporting will be clinically and statistically sound and administratively feasible for hospitals. OSHPD's CCORP team includes biostatisticians, programmers, and a consulting clinician with expertise in cardiology and health services research. We have reviewed the strengths and weaknesses of other CABG reporting systems and drawn on the expertise of CCORP's Clinical Advisory Panel (CAP) to improve on them. The CAP consists of cardiac surgeons, cardiologists and researchers with expertise in quality of care measurement and risk adjustment methods.

Before instituting CCORP, OSHPD staff reviewed the successes and problems experienced by other major CABG outcome reporting projects. We talked extensively with the research teams that produced the New York, Pennsylvania, and New Jersey programs, reviewed the documentation published by each project and conducted our own review of published articles.   We also examined the risk models used by the National Cardiac Surgery Database maintained by the Society of Thoracic Surgeons (STS), The Veteran's Administration, and the Northern New England Program.

Importance of the STS System

Why didn't OSHPD just use the STS system? The STS system is proprietary, relatively expensive, collects more information than needed (it also collects operative and post-operative information, while CCORP focuses only on pre-operative variables) and, though widely used, it is a voluntary system at the individual surgeon (rather than hospital) level. However, CCORP recognizes that many hospitals (nearly 60% of California heart surgery hospitals) and surgeons already use the STS system. Therefore, we have maintained the STS format and data values for many of the data elements collected in CCORP. Staff have consulted closely with the STS National Database Committee and its chairman, who sits on the CCORP Clinical Advisory Panel. If your hospital already uses the STS system, you can still benefit from CCORP's training and auditing programs, which are not part of the STS program.

Since the inception of the voluntary California CABG Mortality Reporting Program (CCMRP), OSHPD has also been furnishing hospitals, free of charge, data collection software restricted to the data elements that program collects. For CCORP, we are continuing that tradition and will provide a free CCORP tool to any hospital that requests it. In addition, staff have recognized that some hospitals have invested considerable resources in developing home-grown systems that fit their hospital's needs. We are allowing submissions using these systems, subject to a number of rules on electronic data format and order specified in the CCORP regulations.

Variable Selection
We arrived at our list of data elements in two ways: first, we were influenced by the consensus statement of a panel of researchers from the other major CABG projects (Jones et al., 1996) including the STS, the New York project, the Northern New England Cardiovascular group, the Parsonnet group, and the Veterans Affairs group.

Second, in order to cast our net widely, we reviewed existing state and federal (Veterans Affairs) systems and assessed the common risk factors used in each and their frequency of use; this gave us a direct "consensus" on data elements. Between these two lists, we identified both the "universe" of risk factors that experts are likely to be interested in, as well as an indication of the relative importance of those factors.

We then presented our candidate list of data elements to the CCORP Clinical Advisory Panel which, on May 7, 2002, approved the final list of data elements to be collected. We ended up with a set of 36 pre-operative risk factors that, according to expert opinion and published reports, appear to account for most of what is explainable (in terms of patients' pre-operative risk) for short-term CABG mortality.

Why is Training for Coding of Risk Factors Critical?
One of the central reasons concerns risk adjustment. Risk adjustment is a technique CCORP employs to compensate for differences among patients that may affect their hospital outcomes. It is a way to level the playing field by accounting for illness, demographics, past operations, and other factors that patients bring to the operating room. Risk adjustment begins by identifying characteristics that are associated with short-term mortality and including them in a model to predict the outcome of interest.

Risk adjustment methods are a critical component of internal quality improvement initiatives and performance measurement programs, like CCORP, that involve comparisons of different providers. By accounting for key differences among patients, risk adjustment allows comparisons of "apples with apples." Failure to adequately adjust for patient risk produces comparisons that may be flawed and misleading. Risk adjustment figures heavily in efforts to track quality, either internally or across facilities, by establishing a valid baseline of comparison.

What Is The Purpose Of Risk Adjustment In CCORP?
Most hospitals and surgeons will have case mix characteristics that are different from the average characteristics of the state. If those differences are not accounted for through risk adjustment, the hospital or surgeon will have outcomes that are not directly comparable to other providers. In effect, an unadjusted outcome report may unfairly "punish" an entity by showing that its performance is worse than average when its poor performance may be due entirely to case mix differences. The goal of risk adjustment is to help CCORP

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determine whether a hospital or surgeon's outcomes are significantly better or worse than the state average, pointing to the need for quality improvement in the latter situation. The process and its results allow consumers, health plans and providers to more fairly compare the outcomes of institutions and individuals.
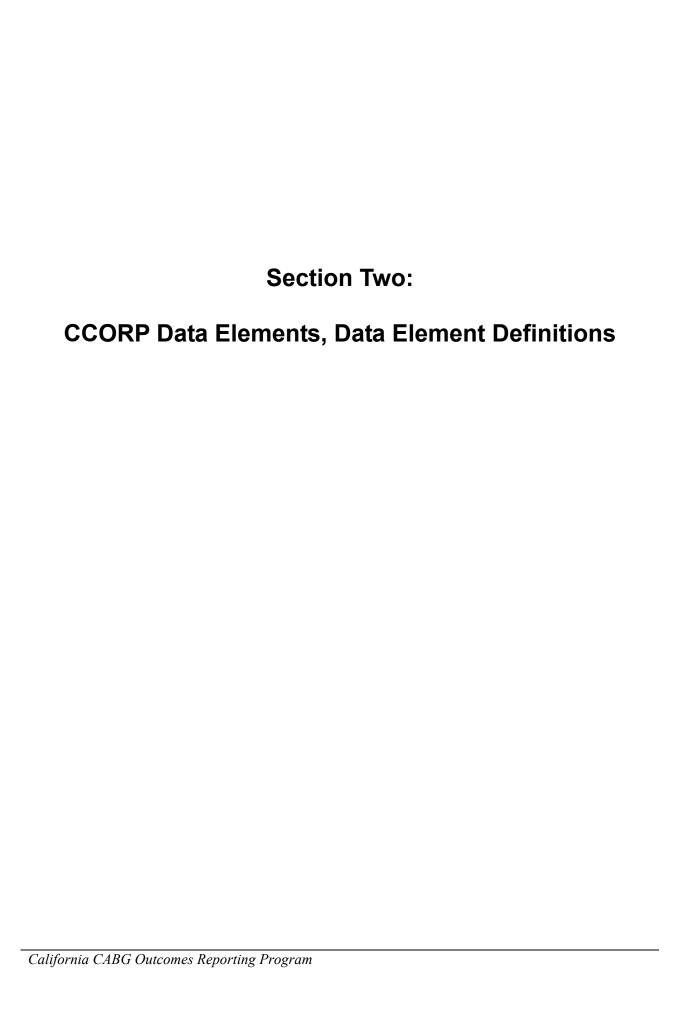
Why The Risk Model Must Perform Adequately
The risk model is a mathematical formula that is used to compute a unique "expected" value (or predicted value) for the surgical outcome of interest. The expected values for each patient are then aggregated at the hospital and/or surgeon level and average expected values are calculated. For example, a hospital's expected mortality rate is calculated and compared to its observed mortality rate in constructing an O/E ratio, which is used to determine whether a hospital performed better, worse than, or as expected. In hospital mortality has a unique risk model and its own set of 30+ risk factors, all of which are measured at the patient level. No risk model is perfect, however, better risk models make better predictions and allow for a more level playing field among providers, enabling fairer comparisons. The more consistent the coding of risk factors is across hospitals, the better CCORP's models will perform and the more valid our outcome ratings will be.

Upcoding and Downcoding of Data Elements
When data abstractors intentionally or unintentionally code data elements from the medical chart with a systematic bias towards recording more severe patient risk factors than actually exist, upcoding or overcoding of data elements results, leading to an overestimation of patient risk. In the opposite case, undercoding or downcoding leads to an underestimation of patient risk. In the first case, the hospital or surgeon's patient's will appear more severely ill than they truly are and the entity will benefit unfairly because it's expected mortality rate will be higher --they will be overcompensated for the case-mix of their patient in the risk-adjustment process. In the undercoding case, the hospital will be penalized because it's expected mortality rate will not reflect the actual patient case-mix. Both situations are to be avoided and proper training will help to assure that consistent coding of data elements exists across hospitals.

CCORP uses both internal data validation methods and an independent medical records audit review to ascertain whether undercoding or overcoding exists at institutions and the degree to which it may be a problem. We are concerned by both, because we know that incomplete coding of risk factors can easily be as large a problem as deliberate overcoding of risk factors, especially when hospital resources are constrained. When, through the audit process or other means, CCORP finds that a hospital has not coded its data in a manner consistent with the data definitions and clarifications provided, it may ask the facility to recode some or all of its data, which is a costly and time-intensive activity. We encourage data abstractors to code risk factors using the guidance provided today to: make efficient use of their limited resources, ensure adequate assessment of patient risk, and to enhance the fairness of the ultimate quality comparisons.

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Section Two:

CCORP Data Elements, Data Element Definitions

CCORP Data Element Overview

	IDENTIFICATION AND CLASSIFICATION
1	**Facility Identification Number**
2	**Isolated CABG:** Yes; No
3	**Responsible Surgeon Name** (3 separate fields): Surgeon Last Name; Surgeon First Name; Surgeon Middle Initial
4	**Responsible Surgeon CA License Number**
5	**Medical Record Number**
6	**Date of Birth**: mm/dd/yyyy
7	**Date of Surgery**: mm/dd/yyyy
8	**Date of Discharge**: mm/dd/yyyy
9	**Discharge Status**: Alive; Dead
10	**Date of Death**: mm/dd/yyyy
	RISK FACTOR: DEMOGRAPHIC
11	**Race**: Caucasian; Black; Hispanic; Asian; Native American; Other
12	**Gender**: male; female
13	**Patient Age**: calculated
14	**Height (cm)**
15	**Weight (kg)**
	Risk Factor: Operative
16	**Status of the Procedure**: Emergent/Salvage; Emergent; Urgent; Elective
	RISK FACTOR: COMORBIDITY/OTHER
17	**Last Creatinine Level Preop (mg/dl)**
18	**Dialysis**: Yes; No
19	**Diabetes**: Yes; No
20	**Peripheral Vascular Disease**: Yes; No
21	**Cerebrovascular Disease**: Yes; No
22	**Cerebrovascular Accident**: Yes; No
23	**Cerebrovascular Accident Timing**: Recent (<=2 weeks); Remote (>2 weeks)
24	**Chronic Lung Disease**: No; Mild; Moderate; Severe
25	**Hypertension**: Yes; No
26	**Immunosuppressive Treatment**: Yes; No
27	**Hepatic Failure**: Yes; No

	RISK FACTOR: CARDIAC
28	**Arrhythmia**: Yes; No
29	**Arrhythmia Type**: Sustained VT/VF; Heart Block; Afib/flutter
30	**Myocardial Infarction**: Yes; No
31	**Myocardial Infarction Timing**: <=6 hours; >6 hours but <24 hours; 1 to 7 days; 8 to 21 days; >21 days
32	**Cardiogenic Shock**: Yes; No
33	**Angina**: Yes; No
34	**Angina Type**: stable; unstable
35	**CCS Classification**: No Angina = Class 0; Class I; Class II; Class III; Class IV
36	**Congestive Heart Failure**: Yes; No
37	**NYHA Classification**: Class I; Class II; Class III; Class IV
	RISK FACTOR: PREVIOUS INTERVENTIONS
38	**Number of Prior Cardiac Operations Requiring Cardiopulmonary Bypass**
39	**Number of Prior Cardiac Operations Without Cardiopulmonary Bypass**
40	**Prior PCI**: Yes; No
41	**Interval from Prior PCI to Surgery**: <=6 hours; > 6 hours
	RISK FACTOR: HEMODYNAMIC STATUS
42	**Ejection Fraction (%)**
43	**Ejection Fraction Method**: LV Gram; Radionuclide; Estimate; ECHO
44	**Left Main Disease (% Stenosis)**
45	**Number of Diseased Coronary Vessels**: None; One; Two; Three
46	**Mitral Insufficiency**: None; Trivial; Mild; Moderate; Severe
	PROCESS OF CARE
47	**Internal Mammary Artery(ies) Used as Grafts**: Left IMA; Right IMA; Both IMAs; No IMA
48	**Cardiopulmonary Bypass Used**: Yes; No
49	**Conversion to Cardiopulmonary Bypass**: Yes; No
50	**Primary Incision** Full Sternotomy; Partial Sternotomy; Transverse Sternotomy; Right Vertical Parasternal; Left Vertical Parasternal; Right Anterior Thoracotomy; Left Anterior Thoracotomy; Posterolateral Thoracotomy; Xiphoid; Epigastric; Subcostal
51	**Cardioplegia**: Yes; No

CCORP Data Element Definitions

IDENTIFICATION AND CLASSIFICATION		
Data Element and Definition	**Comments and Examples**	**Origin**
1. Facility Identification Number The six-digit facility identification number assigned by the Office of Statewide Health Planning and Development.		STS (Modified)
2. Isolated CABG: Yes; No. Answer 'No' if any if any of the procedures listed below was performed during coronary artery bypass graft surgery. *(*See end of this section for full definition)*		Non-STS
3. Responsible Surgeon Name (3 separate fields) Surgeon Last Name Text Length 25 Surgeon First Name Text Length 20 Surgeon Middle Initial Text Length 1 Responsible surgeon means the principle surgeon who performs a coronary artery bypass procedure. If a trainee performs this procedure, then the responsible surgeon is the physician responsible for supervising this procedure performed by the trainee. In situations in which a responsible surgeon cannot otherwise be determined, the responsible surgeon is the surgeon who bills for the coronary artery bypass procedure.		STS (Modified)
4. Responsible Surgeon CA License Number: Text Length 10 California physician license number of responsible surgeon, assigned by the Medical Board of California of the Department of Consumer Affairs.		Non-STS
5. Medical Record Number: Text Length 11 Patient medical record number at the hospital where surgery was performed.		STS
6. Date of Birth: mm/dd/yyyy Patient date of birth.		STS
7. Date of Surgery: mm/dd/yyyy Patient date of surgery for the CABG procedure.		STS
8. Date of Discharge: mm/dd/yyyy Patient date of discharge.		STS

CCORP Data Element Definitions

IDENTIFICATION AND CLASSIFICATION cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
9. Discharge Status: Alive; Dead. Patient status upon discharge from the hospitalization in which surgery occurred.		STS
10. Date of Death: mm/dd/yyyy Patient date of death.		STS
RISK FACTOR: DEMOGRAPHIC		
Data Element and Definition	**Comments and Examples**	**Origin**
11. Race: Caucasian; Black; Hispanic; Asian; Native American; Other. Patient race or ethnicity.		STS
12. Gender: Male; Female. Patient gender.		STS
13. Patient Age (calculated) Patient age in years, at time of surgery. This should be calculated from the Date of Birth and the Date of Surgery, according to convention used in the USA (the number of birth date anniversaries reached by the date of surgery).		STS
14. Height: Real number 3.2 digits (e.g. 999.99) Height of the patient in centimeters. Valid Values are between 20 and 251 cm.		STS
15. Weight: Real number 3.2 digits (e.g. 999.99) Weight of the patient in kilograms. Valid values are between 10 and 250 kg.		STS

CCORP Data Element Definitions

Data Element and Definition	Comments and Examples	Origin
16. Status of the Procedure: Emergent/Salvage; Emergent; Urgent; Elective. The status that best describes the clinical status of the patient at the time of surgery. Emergent/Salvage: The patient is undergoing cardiopulmonary resuscitation en route to the operating room or prior to anesthesia induction. Emergent: The patient's clinical status includes any of the following: a. Ischemic dysfunction (any of the following): (A) Ongoing ischemia including rest angina despite maximal medical therapy (medical and/or intra-aortic balloon pump (IABP)); (B) Acute Evolving Myocardial Infarction within 24 hours before surgery; or (C) pulmonary edema requiring intubation. b. Mechanical dysfunction (either of the following): (A) shock with circulatory support; or (B) shock without circulatory support. Urgent: ALL of the following conditions are met: a. Not elective status b. Not emergent status c. Procedure required during same hospitalization in order to minimize chance of further clinical deterioration. d. Worsening, sudden chest pain; congestive heart failure (CHF); acute myocardial infarction (AMI); coronary anatomy; (IABP); unstable angina (USA) with intravenous (IV) nitroglycerin; rest angina, valve dysfunction; or aortic dissection. Elective: The patient's status has been stable in the days or weeks prior to the operation. The procedure could be deferred without increased risk of compromised cardiac outcome.	Status refers to the patient's condition immediately *before surgery*; it should not reflect instability which occurs after the induction of anesthesia or the operative outcome. Status does not assess operative risk but rather how expediently surgery must be performed. Thus, some elective patients may be at higher risk than urgent patients; for example, an elderly patient with an ejection fraction of 20% and COPD operated on electively compared to a young patient with a normal ejection fraction who has ongoing unstable angina. RULE OF THUMB: Elective – wait at home. Urgent – wait in hospital. Emergent – cannot wait. Salvage – no pulse. Elective surgeries are performed on patients whose cardiac function has been stable. They are usually scheduled at least one day prior to surgery, and the clinical picture allows discharge from the hospital with readmission for surgery later. Urgent surgeries are performed on patients whose medical condition requires continuous hospitalization prior to CABG. A critical feature that distinguishes urgent from elective patients is that urgent patients *cannot be safely discharged* prior to their CABG, but they can safely await CABG in the hospital. An intra-aortic balloon pump or IV nitroglycerin may be part of treatment. Emergent surgeries are performed on patients	STS

CCORP Data Element Definitions

	whose condition dictates that the surgery be performed within several hours to prevent morbidity or death. These cases should take precedence over an elective case, cause a new operating room to be opened, or be done at night or on a weekend if necessary. A critical feature which distinguishes emergent from urgent patients is that emergent patients *cannot safely delay CABG even while they are in the hospital.* Emergent cases are rare. Examples include CABG performed as primary revascularization during an acute MI, immediately (within minutes to a few hours) after angioplasty disaster, or while the patient is *still* in cardiogenic shock. Emergent/Salvage surgeries are performed on a patient undergoing CPR en route to operating room or in the operating room prior to induction of anesthesia. Patient is pulseless within hour prior to surgery.	

CCORP Data Element Definitions

RISK FACTOR: COMORBIDITY/OTHER		
Data Element and Definition	**Comments and Examples**	**Origin**
17. Last Creatinine Level Preop (mg/dl): Real number 2.1 digits (e.g. 99.9) The most recent creatinine level prior to surgery. A creatinine level should be collected on all patients for consistency, even if they have no prior history. Valid values are between 0.1 and 30 mg/dl.		STS
18. Dialysis: Yes; No. The patient is on dialysis preoperatively.	Refers to whether the patient is currently on dialysis, not distant past history	STS
19. Diabetes: Yes; No. The patient has a history of diabetes, regardless of duration of disease or need for anti-diabetic agents.	Note that this is a very liberal definition of diabetes which includes type I, type II (adult-onset), diet-controlled, or diabetes on oral medications or insulin.	STS
20. Peripheral Vascular Disease: Yes; No. The patient has a history at any time prior to surgery of Peripheral Vascular Disease, as indicated by claudication either with exertion or rest; amputation for arterial insufficiency; aorto-iliac occlusive disease reconstruction; peripheral vascular bypass surgery, angioplasty, or stent; documented abdominal aortic aneurysm (AAA), AAA repair, or stent; positive non-invasive testing documented. Excludes Cerebrovascular Disease.	For example, code peripheral vascular disease if the patient has a >50% stenosis of the aortic, iliac, femoral, or popliteal vessels; a history of surgery or angioplasty for such a stenosis; a history of an aortic aneurysm; classic claudication. Cerebrovascular disease is not included in peripheral vascular disease, since it has its own data element. Renal artery stenosis also qualifies as PVD.	STS
21. Cerebrovascular Disease: Yes; No. The patient has a history at any time prior to surgery of Cerebrovascular Disease, documented by any one of the following: unresponsive coma > 24 hours; cerebrovascular accident (CVA) (symptoms > 72 hours after onset); reversible ischemic neurological deficit (RIND) (recovery within 72 hours of onset); transient ischemic attack (TIA) (recovery within 24 hours of onset); non-invasive carotid test with > 75% occlusion; or prior carotid surgery.	Another example of CVD is patients who have had a carotid endarterectomy.	STS

CCORP Data Element Definitions

RISK FACTOR: COMORBIDITY/OTHER cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
22. Cerebrovascular Accident: Yes; No. Has a history, at any time prior to surgery, of a central neurologic deficit persisting more than 72 hours. (i.e. extremity weakness or loss of motion, loss of consciousness, loss of speech, field cuts). Chart documentation of a prior diagnosis of CVA or stroke is sufficient.	Chart documentation of a diagnosis of CVA or stroke at any time prior to surgery is sufficient.	STS
23. Cerebrovascular Accident Timing: Recent (<=2 weeks); Remote (>2 weeks). Events occurring within two weeks of the surgical procedure are considered recent; all others are considered remote.		STS
24. Chronic Lung Disease: No; Mild; Moderate; Severe. Specify if the patient has chronic lung disease, and the severity level according to the following classification: No: No chronic lung disease present. Mild: Forced expiratory volume in one second (FEV1) 60% to 75% of predicted, and/or on chronic inhaled or oral bronchodilator therapy. Moderate: FEV1 50-59% of predicted, and/or on chronic steroid therapy aimed at lung disease. Severe: FEV1 <50% predicted, and/or room air partial pressure of oxygen (pO2) < 60 or room air partial pressure of carbon dioxide (pCO2) > 50.	The definition requires 1) documentation of a diagnosis of *chronic* pulmonary disability, and 2) confirmation based on either pulmonary function test (PFT) data or *chronic* therapy. Patients do NOT have COPD merely on the basis of a heavy smoking history or being labeled "COPD" in the chart without PFTs or history of prior therapy for COPD. Severity is determined by severity of PFT abnormality or type of chronic therapy.	STS
25. Hypertension: Yes; No. The patient has a diagnosis of hypertension, documented by one of the following: a. Documented history of hypertension diagnosed and treated with medication, diet and/or exercise b. Blood pressure > 140 systolic or > 90 diastolic on at least 2 occasions. c. Currently on antihypertensive medication.	Note that the definition does not count isolated elevations as hypertension.	STS

CCORP Data Element Definitions

RISK FACTOR: COMORBIDITY/OTHER cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
26. Immunosuppressive Treatment: Yes; No. Patient has used any form of immunosuppressive therapy (i.e. systemic steroid therapy) within 30 days preceding the operative procedure. Does not include topical applications and inhalers.	Patients post organ transplant or with major rheumatologic conditions may be on such treatment, such as cyclosporine, azathioprine (Imuran), cyclophosamide (Cytoxan).	STS
27. Hepatic Failure: Yes; No. The patient has cirrhosis, hepatic failure, acute hepatitis or "shock liver" and has a bilirubin greater than 2mg/dl and a serum albumin less than 3.5 grams/dl.	Note that patient must have both a clinical history of cirrhosis, hepatic failure, acute hepatitis or "shock liver AND lab test abnormalities. Lab test abnormality alone is not sufficient.	Non-STS
RISK FACTOR: CARDIAC		
Data Element and Definition	**Comments and Examples**	**Origin**
28. Arrhythmia: Yes; No. A preoperative arrhythmia present within two weeks prior to the procedure, by clinical documentation of any one of the following: Atrial fibrillation/flutter requiring medication; Heart block; Sustained Ventricular Tachycardia or Ventricular Fibrillation requiring cardioversion and/or intravenous amiodarone.		STS
29. Arrhythmia Type: Sust VT/VF; Heart Block; Afib/Flutter. The type of arrhythmia present within two weeks prior to the procedure is: Sustained Ventricular Tachycardia or Ventricular Fibrillation requiring cardioversion and/or intravenous amiodarone; Heart Block; Atrial fibrillation/flutter requiring medication.	Sustained VT/VF is the arrhythmia of interest to CCORP. If the patient had both VT/VF and another type of arrhythmia, please choose VT/VF. Note VT/VF must have occurred within two weeks of surgery. Sustained VT/VF is > 30 seconds or requires electrical cardioversion. Ventricular arrhythmia does NOT refer to frequent PVC's (premature ventricular beats), bigeminy, or non-sustained ventricular tachycardia. Use of intravenous lidocaine for Sust VT/VF also qualifies.	STS

CCORP Data Element Definitions

RISK FACTOR: CARDIAC cont.		
Data Element and Definition	**Comments and Examples**	**Origin**

30. Myocardial Infarction: Yes; No.
Refers to any myocardial infarction (MI) in the past. For MIs prior to the current hospitalization for which detailed records are not available, chart documentation in which a clinician caring for the patient diagnosed an MI is sufficient. For MIs during the current hospitalization for which detailed records are available, conditions A and B below must all be met:
A) The patient must have been diagnosed with a myocardial infarction (ST elevation or non ST elevation) by a clinician caring for patient.
B) At least 1 of the 3 following biochemical indicators for detecting myocardial necrosis must be present:
  1) Troponin T or I:
    a. Maximal concentration of troponin T or I exceeding the MI diagnostic limit (99th percentile of the values for a reference control group, as defined in section C) on at least one occasion during the first 24 hours after the index clinical event.
  2) CK-MB:
    a. Maximal value of CK-MB more than two times the upper limit of normal on at least one occasion during the first 24 hours after the index clinical event.
    b. Maximal value of CK-MB, preferable CK-MB mass, exceeding 99th percentile of the values for a reference control group, as defined in section C, on two successive samples during the first 24 hours after the index clinical event.
  3) Total CK:
    a. In the absence of availability of a troponin or CK-MB assay, total CK more than two times the upper limit of normal (99th percentile of the values for a reference control group, as defined in section C), or the B fraction of CK may be employed, but these last two biomarkers are considerably less satisfactory than CK-MB.
C) Reference control values (MI diagnostic limit and upper limit of normal):
  1) Reference values must be determined in each laboratory by studies using specific assays with appropriate quality control, as reported in peer-
	Myocardial infarctions (MI) any time prior to surgery are counted. Since the four criteria required by STS are frequently not available for past MIs, CCORP accepts chart documentation of a history of MI. CCORP also accepts MIs for which the patient was not hospitalized. However, chart reviewers should not attempt to diagnose an MI which was not diagnosed by the clinicians caring for the patient (eg, based on coder's retrospective reading of ECG).	STS

CCORP Data Element Definitions

reviewed journals. Acceptable imprecision (coefficient of variation) at the 99th percentile for each assay should be defined as less than or equal to 10 percent. Each individual laboratory should confirm the range of reference values in their specific setting.		
31. Myocardial Infarction Timing: <=6 hours; >6 hours but <24 hours; 1 to 7 days; 8 to 21 days; >21 days. Time period between the last documented myocardial infarction and the CABG surgery.		STS
32. Cardiogenic Shock: Yes; No. The patient, at the time of procedure, is in a clinical state of hypoperfusion according to either of the following criteria: 1. Systolic blood pressure (BP) < 80 and/or Cardiac Index (CI) < 1.8 despite maximal treatment. 2. Intravenous inotropes and/or intra-aortic balloon pump (IABP) necessary to maintain Systolic BP > 80 and/or CI > 1.8.	Patient either 1) *currently* has SBP <= 80 mmHg and/or CI <= 1.8, or 2) *previously* the SBP and/or CI met these criteria but now the patient is on inotropes or IABP.	STS

CCORP Data Element Definitions

RISK FACTOR: CARDIAC cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
33. Angina: Yes; No. The patient has ever had angina pectoris.	The STS states they intended this to be "Yes" if the patient has ever had angina.	STS
34. Angina Type: Stable; Unstable. The type of angina present within 24 hours prior to CABG surgery is: • Stable: Angina not meeting unstable criteria below. • Unstable: Requires continuous hospitalization from the episode until surgery and one of the following: 1) Angina at rest. 2) New onset angina in past 2 months of at least Canadian Cardiovascular Society (CCS) Class III. 3) Increasing angina in past 2 months - angina that has become more frequent, longer in duration, or lower in threshold; and increased by greater than or equal to 1 CCS class to at least CCS Class III severity.	Patients presenting with angina at rest who are subsequently diagnosed with a MI would have angina=Yes, type=unstable, CCS=class IV, MI=Yes.	STS

CCORP Data Element Definitions

RISK FACTOR: CARDIAC cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
35. CCS Classification: No Angina = Class 0; Class I; Class II; Class III; Class IV. Canadian Cardiovascular Society (CCS) Classification. This classification represents level of functional status related to frequency and intensity of angina. The CCS may not be the same as the NYHA classification for the same evaluation time period. Code the highest class leading to episode of hospitalization and/or intervention: 0=No angina. I= Ordinary physical activity, such as walking or climbing the stairs does not cause angina. Angina may occur with strenuous, rapid or prolonged exertion at work or recreation. II= There is a slight limitation of ordinary activity. Angina may occur with moderate activity such as walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals or in the cold, in the wind, or under emotional stress, or walking more than two blocks on the level, and climbing more than one flight of stairs at normal pace under normal conditions. III= There is marked limitation of ordinary physical activity. Angina may occur after walking one or two blocks on the level or climbing one flight of stairs under normal conditions at a normal pace. IV= There is inability to carry on any physical activity without discomfort; angina may be present at rest.	"…leading to episode of hospitalization and/or intervention…" is vague. Usually coded as highest CCS class in the two weeks before surgery. Patients may be coded into a CCS anginal class even if their angina is due to a MI. Patients who have never had angina are coded as angina=No, CCS=Class 0.	STS
36. Congestive Heart Failure: Yes; No. The patient has symptoms that occurred within 2 weeks prior to surgery. This does not include patients with chronic or stable non-symptomatic compensated congestive heart failure (CHF). The patient has one or more of the following: Paroxysmal nocturnal dyspnea (PND). Dyspnea on exertion (DOE) due to heart failure. Chest X-Ray (CXR) showing pulmonary congestion. Pedal edema or dyspnea and receiving diuretics or digoxin.	The previous STS definition of CHF did not clearly specify whether a past history of heart failure qualified as CHF. Note that the current STS definition clearly specifies that CHF signs or symptoms must have occurred within 2 weeks prior to surgery to code a patient as CHF=Yes. Since evidence of recent CHF symptoms is not always available in current medical record, CCORMP accepts chart documentation that the patient was diagnosed with a CHF episode within the two weeks prior to surgery.	STS

RISK FACTOR: CARDIAC cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
37. NYHA Classification: Class I; Class II; Class III; Class IV. New York Heart Association (NYHA) Classification represents the overall functional status of the patient in relationship to both congestive heart failure and angina. The NYHA may not be the same as the CCS classification for the same evaluation period. Code the highest level leading to episode of hospitalization and/or procedure. I= Patients with cardiac disease but without resulting limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea or anginal pain. II= Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitations, dyspnea or anginal pain. III= Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary physical activity results in fatigue, palpitations, dyspnea, or anginal pain. IV= Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.	The STS changes their definition. NYHA used to refer to CHF symptoms only. Now it refers to any limitation of functi1`onal status.	STS

CCORP Data Element Definitions

RISK FACTOR: PREVIOUS INTERVENTIONS		
Data Element and Definition	**Comments and Examples**	**Origin**
38. Number of Prior Cardiac Operations Requiring Cardiopulmonary Bypass: Integer length 1 Prior to this operation, the number of cardiac surgical operations performed on this patient utilizing cardiopulmonary bypass. Valid values are between 0 and 9.	For 39 and 40, cardiac surgeries include CABG, valve replacement/repair, intracardiac repairs (ASD, VSD), ventricular aneurysmectomy, or surgery on the aortic arch. Do *not* record the date of the prior PTCA's, non-cardiac vascular surgeries such as abdominal aortic aneurysm repairs or fem-pop bypasses, or pacemaker/defibrillator implantations.	STS
39. Number of Prior Cardiac Operations Without Cardiopulmonary Bypass: Integer length 1 Prior to this operation, the number of cardiac surgical operations performed on this patient without cardiopulmonary bypass. Valid values are between 0 and 9..	See comment for 39.	STS
40. Prior PCI: Yes; No. Percutaneous coronary-intervention (PCI) was done at any time prior to this surgical procedure (which may include during the current admission). PCI includes percutaneous transluminal coronary angioplasty (PTCA), intracoronary fibrinolysis without PTCA, laser recanalization, stent implantation, rheolysis with angiojet, brachytherapy, and other catheter-based percutaneous recanalization techniques.	Includes coronary stenting	STS (Modified)
41. Interval from prior PCI to Surgery: <=6 hours; > 6 hours. The time between PCI and surgical repair of coronary occlusion: <=6 hours > 6 hours		STS (Modified)

CCORP Data Element Definitions

RISK FACTOR: HEMODYNAMIC		
Data Element and Definition	**Comments and Examples**	**Origin**
42. Ejection Fraction (%): Integer length 2 The percentage of blood emptied from the ventricle at the end of the contraction. Use the most recent determination prior to intervention. Enter a percentage in the range of 5-90.	Valid Values: 5 – 90 Ejection fraction (EF) is an important predictor of risk. Make every effort to obtain it when available. If a range of EF's are given, enter the mean value (e.g. for "30 to 35%", enter "32" - the system has no space for 32.5). If the EF or "left ventricular function" is described qualitatively, enter as follows: normal = 65%, mildly reduced = 50%, moderately reduced = 35%, and severely reduced = 20%.	STS
43. Ejection Fraction Method: LV Gram; Radionuclide; Estimate; ECHO. Method of obtaining ejection fraction measurement information: LV Gram: Left Ventriculogram. Radionuclide: MUGA Scan. Estimate: From other calculations, based upon available clinical data. ECHO: Echocardiogram.	Since operative conditions may artifactually alter ejection fraction and mitral regurgitation, readings from preoperative trans-thoracic echocardiograms are generally more accurate than those from trans-esophageal echocardiograms (TEE's) done during surgery. Use the last determination of EF prior to surgery. "Estimated" LVEFs based on inspection of an echocardiogram or LV gram is acceptable if documented in the written report for that study. Calculated or quantified LVEF based on planimetry is not required. LVEFs which are guessed at based on clinical presentation (and not based on imaging of the ventricle) are not acceptable.	STS
44. Left Main Disease (% Stenosis): Integer length 3 Percentage of compromise of vessel diameter in any angiographic view. Valid values are between 0 and 100.	When stenosis is described qualitatively: "subtotal" = 99%, "critical" = 90%, "severe" = 80%, "moderate" = 35%, "mild" = 20%, "borderline" = 50%, "significant" = 70%. Terms such as plaquing or luminal irregularity should be considered mild (20%).	STS (Modified)

CCORP Data Element Definitions

RISK FACTOR: HEMODYNAMIC cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
45. Number of Diseased Coronary Vessels: None; One; Two; Three. The number of major coronary vessel systems (Left anterior descending (LAD) system, Circumflex system, and/or Right system) with >50% narrowing in any angiographic view. NOTE: Left main disease (>50%) is counted as TWO vessels (LAD and Circumflex). For example, left main and right coronary artery (RCA) would count as three total.	The number of vessels refers to the number of major coronary arteries which are diseased. Consider a major coronary artery as diseased if it or one of its first order branches has a greater than *or equal to* 50% stenosis. The three major coronary arteries and their first order branches are 1) the left anterior descending (LAD) with its branches the diagonals; 2) the circumflex (Cx) with its branches the obtuse marginals (OM's) or circumflex marginals; and 3) the right coronary artery (RCA) with its branch the posterior descending artery (PDA). The STS now considers Left Main Disease to count as TWO vessels–-encompassing the LAD and Circumflex (see NOTE under definition column). As such, if the chart indicates that Left Main, LAD and Circumflex are all diseased, code the number of diseased vessels as TWO, so as not to double count the Left Main. When the posterior-descending artery (PDA) is supplied by the circumflex (i.e., when the circumflex instead of the right coronary artery is dominant), standard practice is to count the PDA (but NOT the non-dominant RCA) as a major vessel. Thus, a patient with stenoses of the LAD, an obtuse marginal branch off of the circumflex, and the PDA off of the circumflex would be coded as having 3 vessel disease. NOTE: the number of major arteries which are counted as diseased may differ from the number of bypass grafts placed (e.g., a graft may be placed to a vessel with < 50% stenoses or two grafts to the LAD and diagonal even though both are part of a single major vessel).	STS

CCORP Data Element Definitions

RISK FACTOR: HEMODYNAMIC cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
46. Mitral Insufficiency: None; Trivial; Mild; Moderate; Severe. Indicate if there is evidence of mitral valve regurgitation and if so, the severity level.	If a range of MR is given, enter the higher value (e.g. for "2 to 3" enter "3"). Since operative conditions may artifactually alter ejection fraction and mitral regurgitation, readings from preoperative trans-thoracic echocardiograms are generally more accurate than those from trans-esophageal echocardiograms (TEE's) done during surgery.	STS
PROCESS INFORMATION		
Data Element and Definition	**Comments and Examples**	**Origin**
47. Internal Mammary Artery(ies) Used as Grafts: Left IMA; Right IMA; Both IMAs; No IMA. Internal Mammary Artery(ies) (IMA) used for grafts, if any. (a) Left IMA; Right IMA; Both IMAs; No IMA.		STS
48. Cardiopulmonary Bypass Used: Yes; No. Use of Cardiopulmonary Bypass (CPB) at any time during the procedure.		STS
49. Conversion to Cardiopulmonary Bypass: Yes; No. The patient needed to be placed on cardiopulmonary bypass (CPB) after the off-pump procedure was attempted.		STS

CCORP Data Element Definitions

PROCESS INFORMATION cont.		
Data Element and Definition	**Comments and Examples**	**Origin**
50. Primary Incision: Full Sternotomy; Partial Sternotomy; Transverse Sternotomy; Right Vertical Parasternal; Left Vertical Parasternal; Right Anterior Thoracotomy; Left Anterior Thoracotomy; Posterolateral Thoracotomy; Xiphoid; Epigastric; Subcostal. The primary incision used as the initial intention for treatment: Full Sternotomy Partial Sternotomy Transverse Sternotomy Right Vertical Parasternal Left Vertical Parasternal Right Anterior Thoracotomy Left Anterior Thoracotomy Posterolateral Thoracotomy Xiphoid Epigastric Subcostal		STS
51. Cardioplegia: Yes; No. Cardioplegia was used.		STS

_____

* Data Element Definition - 2. Isolated CABG:
Format: Text
Valid Values: Yes; No
Definition/Description:
 When any of the procedures listed in section A is performed concurrently with the coronary artery bypass surgery, the surgery will be considered non-isolated and the data element coded 'No'. It is not possible to list all procedures because cases can be complex and clinical definitions are not always precise. When in doubt, the data abstractor should first seek an opinion from the responsible surgeon and then consult CCORP.

Section A
- Valve repairs or replacements
- Operations on structures adjacent to heart valves (papillary muscle, chordae tendineae, traebeculae carneae cordis, annuloplasty, infundibulectomy)
- Ventriculectomy
- Repair of atrial and ventricular septa, excluding closure of patent foramen ovale
- Excision of aneurysm of heart
- Head and neck, intracranial endarterectomy
- Other open heart surgeries, such as aortic arch repair, pulmonary endarterectomy
- Endarterectomy of aorta
- Thoracic endarterectomy (endarterectomy on an artery outside the heart)
- Heart transplantation
- Repair of certain congenital cardiac anomalies, excluding closure of patent foramen ovale (e.g., tetralology of fallot, atrial septal defect (ASD), ventricular septal defect (VSD), valvular abnormality)
- Implantation of cardiomyostimulation system (Note: Refers to cardiomyoplasty systems only, not other heart-assist systems such as pacemakers or internal cardiac defibrillators (ICDs))
- Any aortic aneurysm repair (abdominal or thoracic)
- Aorta-subclavian-carotid bypass
- Aorta-renal bypass
- Aorta-iliac-femoral bypass
- Caval-pulmonary artery anastomosis
- Extracranial-intracranial (EC-IC) vascular bypass
- Coronary artery fistula
- Maze procedures, surgical or catheter
- Resection of a portion of the lung (e.g., excision of an emphysematous bleb, lobectomy or segmental resection of lung). Does not include simple biopsy of lung nodule in which surrounding lung is not resected or biopsy of a thoracic lymph node.
- Mastectomy for breast cancer (not simple breast biopsy)

If a procedure listed in section B is performed concurrently with the coronary artery bypass surgery, the surgery will be considered an isolated CABG and the data element coded 'Yes,' unless a procedure listed in section A is performed during the same surgery. These particular procedures are listed because the Office has received frequent questions regarding their coding.

Section B
- Transmyocardial laser revascularization (TMR)
- Pericardiectomy and excision of lesions of heart
- Repair/restoration of the heart or pericardium
- Coronary endarterectomy
- Pacemakers
- Internal cardiac defibrillators (ICDs)
- Fem-fem cardiopulmonary bypass (a form of cardiopulmonary bypass that should not be confused with aortofemoral bypass surgery listed in Section A)

_____

Section Three: *Quizzes*

Quiz 1

1a. A patient has a history of an asymptomatic 75% carotid stenosis of the right internal carotid artery. How would you code this patient?

    a) Cerebrovascular disease?   Yes   No
    b) Cerebrovascular accident?   Yes   No
    c) CVA timing ($\leq$ or > 2 wks)   <=2 weeks   >2 weeks
    d) Peripheral vascular disease?   Yes   No

2. A 69 year-old male presented with unstable angina. He ruled out for a myocardial infarction. While on telemetry, he had frequent PVC's (> 10/hour) with rare couplets which were asymptomatic and which were treated with IV lidocaine. How would you code this patient?

    a) Arrhythmia?   Yes   No

    b) Arrhythmia type?   Sustained VT/VF   Heart Block   Afib/flutter

3. A 61 year-old male undergoes CABG. The coronary angiography report gives the following result: a 60% stenosis of the left main, a 75% stenosis of the left anterior descending, an 85% stenosis of the first diagonal, a 90% stenosis of the second diagonal, plaquing of the circumflex, a 30% stenosis of the right coronary artery, and a 75% stenosis of the posterior descending artery (PDA). How would you code this patient?

    a) Number of diseased vessels?   None   One   Two   Three
    b) Left main disease   _____%

4. 72 year-old male underwent CABG. The admitting note reports a history of claudication. How would you code this patient?

    a) Peripheral vascular disease?   Yes   No

5. The left ventriculogram was read as showing an ejection fraction of 50-60% with mild mitral regurgitation while the preoperative echocardiogram reported an ejection fraction of 62% with mild to moderate mitral regurgitation. How would you code this patient?

    a) Ejection fraction   _____%
    b) Ejection fraction method?   LV gram ECHO Radionuclide Estimate
    c) Mitral regurgitation?   None Trivial Mild Moderate Severe

6. The preoperative left ventriculogram was read as "ejection fraction severely reduced" with "2+" mitral regurgitation. How would you code the patient?

   a) Ejection fraction? _____%
   b) Ejection fraction method? LV gram   ECHO   Radionuclide   Estimate
   c) Mitral regurgitation?   None   Trivial   Mild   Moderate   Severe

7. A 71 year female undergoes CABG 2 days after a failed PTCA. She is not felt to be stable enough to leave the hospital between the PTCA and CABG. She has a history of mitral valve replacement 20 years earlier for rheumatic heart disease. How would you code this patient?

   a) Number of prior cardiac operations requiring cardiopulmonary bypass?

   _____

   b) Number of prior cardiac operations without cardiopulmonary bypass?

   _____

   c) Status?   Elective   Urgent   Emergent   Emergent/Salvage

8. The admitting history and physical notes a history of adult onset diabetes. The patient is not on insulin or oral hypoglycemic agent. How would you code this patient?

   a) Diabetes?   Yes   No

9. The coronary angiography report gives the following result: 50% stenosis of the left main, an 80% stenosis of the left anterior descending (LAD), a 70% stenosis of the first diagonal, a subtotal occlusion of the circumflex, and luminal irregularities of the right coronary artery (RCA). At surgery, the patient has four coronary bypass grafts placed to the distal LAD, the first diagonal, the second obtuse marginal, and the right coronary artery. How would you code this patient?

   a) Number of diseased vessels?   None   One   Two   Three
   b) Left main disease _____ %

10. The chart documents a history of an abdominal aortic aneurysm repair in the past. How would you code this patient?

   a) Peripheral vascular disease?   Yes   No

Quiz 2

1. A healthy 71 year-old female was admitted with 30 minutes of chest pain at rest which resolved after a single sublingual nitroglycerin in the ER. She was admitted to a telemetry bed, treated with topical nitroglycerin, aspirin, and IV heparin, and ruled out for myocardial infarction. On the second hospital day, the patient underwent a treadmill stress test which was positive. The next day, coronary angiography revealed a normal ejection fraction and a normal left main, an 80% stenosis of the mid LAD, 70% stenosis of the circumflex, and a 70% stenosis of the right coronary artery without thrombus. She remained free of recurrent chest pain. On the fourth hospital day, she underwent bypass surgery. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage
    b) Angina?   Yes   No
    c) Angina type? Unstable   Stable
    d) CCS class?   0   I   II   III   IV

2. A 63 year-old male with a history of stable angina presented to the emergency room with 30 minutes of chest pain at rest and ECG changes consistent with ischemia. Chest pain and ECG changes initially resolved with IV nitroglycerin and heparin and the patient was admitted to the ICU. The next day, cardiac catheterization revealed a normal ejection fraction and three vessel coronary artery disease. During the catheterization, the chest pain recurred for 20 minutes and intra-aortic balloon pump was placed. Subsequently, the patient ruled out for myocardial infarction and remained hemodynamically stable without further symptoms or ECG changes. He underwent CABG two days after the catheterization. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage
    b) Angina?   Yes   No
    c) Angina type? Unstable   Stable
    d) CCS class?   0   I   II   III   IV

3. A 61 year-old male presented to the emergency room with three hours of crushing chest pain at rest and ST segment elevation on electrocardiogram consistent with an anterior myocardial infarction. His blood pressure was 75/40 with a heart rate of 115 and he was in heart failure by exam. He was taken directly to cardiac catheterization, which revealed an ejection fraction of 35% and an occluded proximal LAD coronary artery with significant disease of the left main and right coronary arteries. Intravenous dopamine was begun, a balloon pump was placed, and his blood pressure improved to 100/60. He was taken directly from the cath lab to the operating room where he underwent CABG. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage
    b) Angina?   Yes   No
    c) Angina type?   Unstable   Stable
    d) CCS class?   0   I   II   III   IV
    d) Cardiogenic shock Yes   No

4. A 55 year old female undergoing an elective angioplasty had acute closure of her LAD resulting in a cardiac arrest. She was twice resuscitated with return of a blood pressure but went directly to the operating room for CABG while still receiving chest compressions and with an only intermittently palpable pulse. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage

5a. A 73 year-old male was admitted with unstable angina and treated with IV nitroglycerin and IV heparin. Cardiac catheterization revealed an ejection fraction of 45%, normal cardiac hemodynamics and three vessel disease. While still in the hospital the day following the catheterization, the patient had recurrent chest pain at rest that was relieved but then recurred after each of three sublingual nitroglycerins. Despite increasing doses of IV nitroglycerin, the chest pain associated with ischemic ECG changes persisted until he was taken to bypass surgery several hours later. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage

5b. A 73 year-old male was admitted with unstable angina and treated with IV nitroglycerin and IV heparin. Cardiac catheterization revealed an ejection fraction of 45%, normal cardiac hemodynamics, and three vessel disease. While still in the hospital the day following the catheterization, the patient had recurrent chest pain at rest that was not relieved despite increasing doses of IV nitroglycerin. Chest pain finally resolved with placement of an IABP. He remained stable and was taken to bypass surgery the next day. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage

5c. A 52 year-old female presented to the ER with chest pain anterior ST elevation consistent with a myocardial infarction. She was taken immediately to cardiac catheterization for planned primary angioplasty; however, catheterization revealed anterior akinesis with ejection fraction of 35%, an 80% left main stenosis, a 100% LAD stenosis, an 80% circumflex stenosis, and a normal RCA. She was taken to CABG 2 hrs later. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage
    b) Angina?   Yes   No
    c) Angina type? Unstable   Stable
    d) CCS class?   0   I   II   III   IV
    e) Number of diseased vessels? None   Single Double   Triple
    f) Left main disease _____%
    g) MI?   Yes   No
    h) MI when?   < 6 hr < 24 hrs 1-7days 8-21days >21days

5d. A 52 year-old female presented to the ER with chest pain anterior ST elevation consistent with a myocardial infarction. She was taken immediately to cardiac catheterization for planned primary angioplasty; however, catheterization revealed anterior hypokinesis with ejection fraction of 40%, an 80% left main stenosis, a 95% LAD stenosis with an ulcerated plaque, an 80% circumflex stenosis, and a normal RCA. She was treated with ASA, heparin, integrelin, and beta-blockers and chest pain and ECG changes resolved. She was admitted to the ICU where she remained chest pain free and ruled in for a small myocardial infarction. She was taken to CABG 2 days later. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage
    b) Angina?   Yes   No
    c) Angina type? Unstable   Stable
    d) CCS class?   0   I   II   III   IV
    e) Number of diseased vessels? None   Single Double   Triple
    f) Left main disease _____%
    g) MI?   Yes   No
    h) MI when?   < 6 hr < 24 hrs 1-7days 8-21days >21days

6. A 59 year male undergoes elective CABG. His medical record reports an admission for "congestive heart failure" 2 years ago requiring IV diuretics. At the time of his surgery, however, he has not recently had symptoms of heart failure, been on any diuretics or vasodilators, or had exam or X-ray findings of heart failure (i.e., rales or chest X-ray with cardiomegaly or interstitial edema). How would you code this patient?

    a) Congestive heart failure?   Yes   No
    b) NYHA Class?   I   II   III   IV

7. A 70 year old female with a history of diabetes and hypertension undergoes CABG. Prior to CABG, she has a history of congestive heart failure requiring admission to the hospital most recently 6 months ago. On her current medications, she has dyspnea with mowing the lawn but no symptoms dressing, cooing, or walking around the house. How would you code this patient?

    a) Congestive heart failure?   Yes   No
    b) NYHA Class?   I   II   III   IV

8. A 77 year old female undergoes CABG. She has a history of congestive heart failure. On her current regimen of daily lasix, digoxin, and an ACE inhibitor, she has dyspnea with showering and dressing, trace ankle edema, and 2 pillow orthopnea. How would you code this patient?

    a) Congestive heart failure?   Yes   No
    b) NYHA Class?   I   II   III   IV

9. A 67 year-old female underwent elective CABG for progressive angina and three vessel disease. The admitting history mentions a history of "chronic obstructive pulmonary disease" and a 70 pack year history tobacco use. However, the patient was not on metered dose inhalers, steroids, theophylline, or other pharmacotherapy for COPD and there is no documentation of FEV1. How would you code this patient?

    a) COPD?   No   Mild   Moderate   Severe

10. A 61 year-old male underwent CABG. The admitting history and physical states the patient is on atrovent and albuterol inhalers for the treatment of "chronic bronchitis." There is no documented FEV1. How would you code this patient?

    a) COPD?   No   Mild   Moderate   Severe

Quiz 3

1. A 73 year-old male undergoes 3-vessel CABG along with an endarectomy of the RCA and placement of an ICD.

   How would you code this patient?

   a) Isolated CABG?   Yes   No

2. A 50 year-old man on inhaled steroids for asthma undergoes CABG.

   How would you code this patient?

a) Immunosuppressive treatment?   Yes   No

2. A 50 year-old man with history of renal transplantation on cyclosporine and prednisone undergoes CABG.

   How would you code this patient?

   a) Immunosuppressive treatment?   Yes   No

3. A 78 year-old female without history of liver disease undergoes CABG. Her albumin is 3.3 g/dl

   How would you code this patient?

   a) Hepatic failure?   Yes   No

Section Four:
Patient Vignettes and Answers

Fifty-One Patient Vignettes

1. An otherwise healthy 65 year-old male presented to the emergency room with 30 minutes of chest pain at rest and ST segment depression on electrocardiogram. Chest pain and ECG changes resolved after a single sublingual nitroglycerin. He was admitted to a telemetry bed, treated with topical nitroglycerin, aspirin, IV heparin, and integrelin. He ruled out for myocardial infarction by serial enzymes. On the second hospital day, the IV heparin and integrelin were turned off and coronary angiography revealed a normal ejection fraction and a 60% stenosis of the left main, a 80% stenosis of the mid LAD, plaquing of the circumflex, and a 70% stenosis of the right coronary artery. He remained on the telemetry unit where he was free of recurrent chest pain or ECG changes on IV heparin and topical nitroglycerin. On the fourth hospital day he underwent bypass surgery. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Emergent/Salvage
    b) Angina?   Yes   No
    c) Angina type?   Unstable   Stable
    d) CCS class?   0   I   II   III   IV
    e) Number of diseased vessels?   None   One   Two   Three
    f) Left main disease? _____%

2. A 65 year-old male with a history of stable angina presented to the emergency room with a 1 week history of severe intermittent precordial chest pressure occurring with very minimal exertion, never occurring at rest or lasting more than 5 minutes. His previous anginal pattern had been mild chest pressure with moderate to strenuous exertion about 2 times per week. He had a history of coronary artery disease, hypertension, and hypercholesterolemia. He was admitted to a telemetry bed, treated with topical nitroglycerin and IV heparin, and ruled out for myocardial infarction by serial enzymes. On the second hospital day coronary angiography revealed a normal ejection fraction, a 60% stenosis of the left main, a proximal 80% stenoses of the LAD, and plaquing of the circumflex and right coronary arteries. He remained free of recurrent chest pain while at bed rest

on IV heparin and topical nitroglycerin. A day after the catheterization, he underwent bypass surgery. How would you code this patient?

a) Status?   Elective   Urgent   Emergent   Salvage
b) Angina?   Yes   No
c) Angina type?   Unstable   Stable
d) CCS class?   0   I   II   III   IV
e) Number of diseased vessels?   None   Single   Double   Triple
f) Left main disease? _____%

3.   A 74 year-old female presented with 3 days intermittent retrosternal chest pain at rest radiating to the arm and associated with nausea. She had a history of coronary artery disease, coronary artery bypass graft surgery (CABG) 6 years earlier following a myocardial infarction, COPD on home oxygen, diabetes, and hypertension. Electrocardiogram showed old Q-waves inferiorly and ST segment depression anteriorly. Chest X-ray was consistent with heart failure. She was admitted to the ICU where she was treated with morphine and IV nitroglycerin and heparin. She ruled in for a subendocardial infarction. On the second day cardiac catheterization revealed an ejection fraction of 30-35%, severe native three vessel coronary disease, an occluded graft to the circumflex, a 95% stenosed vein graft to the LAD, and a patent graft to the right coronary. On the third day she had worsened shortness of breath, orthopnea, tachypnea, and renal insufficiency (creatinine increased to 3.4). She did not respond to lasix and required endotracheal intubation. Her blood pressure was 120-160/60-80. With gradual diuresis, dopamine at 3 mcg/kg/mn, and vasodilators, her heart failure and renal function improved and she was extubated on the 8th hospital day. Albumin was noted to be 3.4 g/dl but she had no history of liver disease. On the 11th hospital day, she underwent bypass surgery (creat was 1.6). How would you code this patient?

a) Status?   Elective   Urgent   Emergent   Salvage
b) Angina?   Yes   No
c) Angina type?   Unstable   Stable
d) CCS class?   0   I   II   III   IV
e) CHF?   Yes   No
f) NYHA class?   I   II   III   IV
g) MI?   Yes   No
h) MI when?   < 6 hr   < 24 hrs   1-7days   8-21days   >21days
i) Cardiogenic shock? Yes   No
j) Creatinine?   _____ mg/dl
k) COPD?   No   Mild   Moderate   Severe
l) Hepatic failure?   Yes   No

4. A 55 year-old female presented to her physician with 2 months intermittent exertional chest pressure without rest pain which was not progressive. After a positive stress test on which the patient exercised for 8 minutes, the patient was referred for catheterization which revealed a normal ejection fraction and an 70% stenosis of left main coronary artery and a 70% stenosis of the right coronary artery. She was admitted directly after the catheterization and remained symptom free at rest on aspirin and topical nitroglycerin. She underwent CABG two days later. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Emergent/Salvage
    b) Angina?   Yes   No
    c) Angina type?   Unstable   Stable
    d) CCS class?   0   I   II   III   IV
    e) Number of diseased vessels?   None   One   Two   Three

5. A 68 year-old male with known coronary artery disease presented to the emergency room with 30 minutes of chest pain at rest and ECG changes consistent with ischemia. Chest pain and ECG changes initially resolved with IV nitroglycerin and the patient was admitted to the ICU. The next day, cardiac catheterization revealed a normal ejection fraction and three vessel coronary artery disease. Following the catheterization, the chest pain recurred and was unrelieved despite therapy with beta-blockers, heparin, Intergrelin, and maximal dose IV nitroglycerin. An intra-aortic balloon pump was placed with immediate relief of angina. The patient ruled out for myocardial infarction and remained hemodynamically stable without further symptoms or ECG changes. The balloon pump was left in place and the patient underwent CABG the day after the catheterization. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage
    b) Angina?   Yes   No
    c) Angina type?   Unstable   Stable
    d) CCS class?   0   I   II   III   IV

6. A 73 year-old female with a history of coronary artery disease presented to the emergency room with 45 minutes of chest pain at rest. The electrocardiogram revealed ST segment depression on consistent with ischemia. Chest pain and ECG ischemic changes resolved with sublingual nitroglycerin and IV heparin. The patient was admitted and ruled in for a small myocardial infarction. Cardiac catheterization two days later revealed an ejection fraction of 45%, normal cardiac hemodynamics and three vessel disease including a 99% diagonal lesion, which was felt to be the lesion responsible for the patient's infarct. While still in the hospital the day following the catheterization, the patient had recurrent chest pain at rest that was relieved but then recurred after each of three sublingual nitroglycerins. She was started on IV nitroglycerin but the chest pain associated with ischemic ECG changes continued to come and go every

few minutes despite increasing doses of nitroglycerin. Blood pressure remained stable and there were no signs of heart failure. The patient was taken to bypass surgery that afternoon. How would you code this patient?

a) Status?   Elective   Urgent   Emergent   Emergent/Salvage
b) Angina?   Yes   No
c) Angina type?   Unstable   Stable
d) CCS class?   0   I   II   III   IV
e) MI?   Yes   No
f) MI when?   <=6 hr   >6hrs <24 hrs   1-7days   8-21days   >21days

7. A 61 year-old female presented to her physician with a 2 week history of intermittent chest pain and shortness of breath. She was felt to have mild heart failure by initial exam which was new onset. She was admitted to telemetry and treated with lasix, IV heparin, and topical nitroglycerin. She underwent cardiac catheterization later that day which revealed an elevated left ventricular end-diastolic pressure of 24, an ejection fraction of 40%, and three vessel disease. She responded well to diuresis and her heart failure resolved. However, the next day after the heparin had been stopped, she had another episode of chest pain at rest lasting 5 minutes and was again found to be in heart failure by exam. The etiology of her new onset and recurrent heart failure was felt intermittent ischemia. Heparin was restarted along with topical nitroglycerin, she remained stable for the next two days, and then underwent CABG. How would you code this patient?

a) Status?   Elective   Urgent   Emergent   Emergent/Salvage
b) Angina?   Yes   No
c) Angina type?   Unstable   Stable
d) CCS class?   0   I   II   III   IV
e) CHF?   Yes   No
f) NYHA class?   I   II   III   IV

8. A 63 year-old male with a history of coronary artery disease and no history of heart failure presented to the emergency room with 20 minutes of chest pain at rest and ST segment depression on electrocardiogram consistent with ischemia. Chest pain and ECG ischemic changes failed to resolve with sublingual nitroglycerin but were relieved by IV nitroglycerin and Integrelin. The patient was admitted to the ICU and ruled out for a myocardial infarction. Cardiac catheterization one day later revealed an ejection fraction of 50%, normal cardiac hemodynamics, and two vessel disease of the mid left anterior descending and proximal right coronary arteries. While still on IV nitroglycerin and heparin following the catheterization, the patient had three episodes within 24 hours of recurrent chest pain that were relieved by additional nitroglycerin and beta-blocker. Blood pressure remained stable and there were no signs of heart failure. The patient was taken to bypass surgery two days after the catheterization and 24 hrs after his last episode of pain. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage
    b) Angina?   Yes   No
    c) Angina type?   Unstable   Stable
    d) CCS class?   0   I   II   III   IV
    e) CHF?   Yes   No
    f) NYHA class?   I   II   III   IV
    g) MI?   Yes   No

9. A 48 year-old male with a 2 week history of new onset, intermittent chest pain called the paramedics during an episode of rest pain. When the paramedics arrived, he suffered a cardiac arrest, was found to be in ventricular fibrillation, and was successfully resuscitated with electrical cardioversion. Later he developed atrial fibrillation. He was treated with IV nitroglycerin and heparin and admitted to the ICU where he remained hemodynamically stable without further episodes of chest pain or arrhythmia. He ruled out for myocardial infarction. Cardiac catheterization the next day revealed an ejection fraction of 60%, lateral wall hypokinesis, and two vessel coronary disease of the LAD and circumflex. The etiology of the patient's ventricular fibrillation and cardiac arrest was felt to be ischemia. He remained stable on IV nitroglycerin and underwent CABG the two days later. How would you code this patient?

    a) Status?   Elective   Urgent   Emergent   Salvage
    b) Angina?   Yes   No
    c) Angina type?   Unstable   Stable
    d) CCS class?   0   I   II   III   IV
    e) CHF?   Yes   No
    f) NYHA class?   I   II   III   IV
    g) MI?   Yes   No
    h) Arrhythmia?   Yes   No
    i) Arrhythmia type? Sustained VT/VF   Heart Block   Afib/Aflutter

10. A 57 year-old female was admitted with an anterior wall myocardial infarction which presented with 2 hours of chest pain at rest. She was treated with TPA infusion, IV nitroglycerin, and heparin and admitted to the ICU. She had no prior history of CHF or other heart disease. Four hours after the onset of her MI, she went into ventricular tachycardia with a drop in her blood pressure. She was quickly electrically cardioverted and placed on IV lidocaine. She had an episode of recurrent chest pain two days later prompting a cardiac catheterization which revealed an ejection fraction of 50%, anterior wall hypokinesis, and three vessel coronary disease. She remained stable without further chest pain or arrhythmia, IV lidocaine was stopped, and she underwent CABG on the fifth hospital day. How would you code this patient?

   a) Status?   Elective   Urgent   Emergent   Salvage
   b) Angina?   Yes   No
   c) Angina type?   Unstable   Stable
   d) CCS class?   0   I   II   III   IV
   e) CHF?   Yes   No
   f) NYHA class?   I   II   III   IV
   g) MI?   Yes   No
   h) Arrhythmia?   Yes   No
   i) Arrhythmia type? Sustained VT/VF   Heart Block   Afib/Aflutter

11. A 51 year-old male presented to the emergency room with dyspnea at rest and a history of 2 hrs of chest pain 3 days earlier. ECG was consistent with a recent anterior myocardial infarction. His blood pressure was 70/40, heart rate of 120 and he had heart failure on exam. Cardiac enzymes revealed a normal CK and elevated troponin. Emergency cardiac catheterization revealed an ejection fraction of 35% and an occluded proximal LAD coronary artery with significant disease of the left main and right coronary arteries. Intravenous inotropes were begun and his blood pressure improved to 95/60. He underwent CABG 2 days later. How would you code this patient?

   a) Status?   Elective   Urgent   Emergent   Emergent/Salvage
   b) Angina?   Yes   No
   c) Angina type?   Unstable   Stable
   d) CCS class?   0   I   II   III   IV
   e) CHF?   Yes   No
   f) NYHA class?   I   II   III   IV
   g) MI?   Yes   No
   h) MI when?   <=6 hr   >6hrs <24 hrs   1-7days   8-21days   >21days

12. A patient has a history of an asymptomatic 90% carotid stenosis of the left internal carotid artery but no history of stroke. How would you code this patient?

    a) Cerebrovascular disease?   Yes   No
    b) Cerebrovascular Accident?   Yes   No
    c) CVA Timing?   <=2 weeks   >2 weeks
    d) Peripheral vascular disease?   Yes   No

13. A 56 year old female with a history of diabetes and hypertension undergoes elective CABG for progressive class II angina and three vessel disease with a normal ejection fraction. Her medical record reports an episode of "congestive heart failure" 2 years ago requiring a brief admission for IV diuretics. At the time of her surgery, however, she has not recently had symptoms of heart failure or had exam or X-ray findings of heart failure (i.e. rales or chest X-ray with cardiomegaly or interstitial edema). How would you code this patient?

    a) Congestive heart failure?   Yes   No
    b) NYHA Class?   I   II   III   IV

14. A 56 year old female with a history of diabetes and hypertension undergoes elective CABG for progressive class III angina and three vessel disease with a normal ejection fraction. She has a history of congestive heart failure requiring admission to the hospital most recently 6 months ago. She currently is treated with daily lasix, ACE inhibitor, and digoxin but has no symptoms or signs of heart failure. Specifically, she has no dyspnea, peripheral edema, rales, or cardiomegaly or interstitial edema on chest X-ray. How would you code this patient?

    a) Congestive heart failure?   Yes   No
    b) NYHA Class?   I   II   III   IV

15. A 56 year old female with a history of diabetes and hypertension undergoes elective CABG for three vessel disease with a normal ejection fraction. She has no angina but has a history of congestive heart failure requiring admission to the hospital most recently 1 year ago. She is being treated with daily lasix and ACE inhibitor. She currently has dyspnea with walking uphill or walking up stairs, trace ankle edema, and occasional PND. How would you code this patient?

    a) Angina   Yes   No
    b) CCS class   0   I   II   III   IV
    c) Congestive heart failure?   Yes   No
    d) NYHA Class?   I   II   III   IV

16. A 56 year old female with a history of diabetes and hypertension undergoes elective CABG for three vessel disease with a normal ejection fraction. Chest X-ray on admission reveals pulmonary venous congestion. She has a

history of congestive heart failure requiring admission to the hospital most recently 3 months ago. She is being treated with daily lasix and an ACE inhibitor. She currently has dyspnea with walking less than 1 block on flat surfaces or walking up 1 flight of stairs, ankle edema, and 2 pillow orthopnea. How would you code this patient?

a) Congestive heart failure?   Yes   No
b) NYHA Class?   I   II   III   IV

17. A 66 year-old male presented to the emergency room with progressive angina and chest pressure at rest consistent with unstable angina. He ruled out for a myocardial infarction. He underwent cardiac catheterization which revealed an ejection fraction of 50% and three vessel disease. While on telemetry before and after his catheterization, he had frequent PVC's (> 10/hour) and several short runs of asymptomatic non-sustained ventricular tachycardia (up to 6 beats) for which he did not receive treatment. He underwent CABG the following day. How would you code this patient?

a) Arrhythmia?   Yes   No

18. A 66 year-old male presented to the emergency room with progressive angina and chest pressure at rest consistent with unstable angina. He ruled out for a myocardial infarction. He underwent cardiac catheterization which revealed an ejection fraction of 50% and three vessel disease. While on telemetry before his catheterization, he had frequent PVC's (> 10/hour) with rare couplets and a one-minute long episode of ventricular tachycardia. He underwent CABG the following day. How would you code this patient?

a) Arrhythmia?   Yes   No

19. A 66 year-old male presented to the emergency room with progressive angina and chest pressure at rest consistent with unstable angina. He was found to be in atrial fibrillation. He ruled out for a myocardial infarction. While on telemetry, he had an episode of ventricular tachycardia lasting five minutes and associated with a fall in blood pressure. He was treated with IV lidocaine. The next day, he underwent cardiac catheterization which revealed an ejection fraction of 50% and three vessel disease. He underwent CABG the following day. How would you code this patient?

a) Arrhythmia?   Yes   No
b) Arrhythmia type?   Sustained VT/VF   Heart Block   Afib/Aflutter

20. A 66 year-old male undergoes elective CABG for progressive angina and three vessel disease with a depressed ejection fraction. Six months earlier, he had an implantable cardiac defibrillator placed for an episode of ventricular tachycardia associated with syncope and requiring electrical cardioversion. How would you code this patient?

a) Arrhythmia?   Yes   No

21. A 69 year-old male underwent elective CABG for progressive angina and three vessel disease. The admitting history mentions a history of "chronic obstructive pulmonary disease" (COPD) and a history of heavy tobacco use. However, the patient was not on metered dose inhalers, steroids, theophylline, or other pharmacotherapy for COPD and there is no documentation of FEV1. How would you code this patient?

a) COPD?   No   Mild   Moderate   Severe

22. A coronary angiogram reveals a LEFT dominant system with no disease of the left main and > 50% stenoses of the LAD, circumflex marginal, and the left posterior descending artery (off of the circumflex) and a normal non-dominant right coronary. How would you code this patient?

a) Number of diseased vessels?   None   One   Two   Three

23. A 71 year-old male undergoes CABG. The coronary angiography report gives the following result: 40% stenosis of the left main, 75% stenosis of the left anterior descending, 80% stenosis of the first diagonal, 90% stenosis of the second diagonal, plaquing of the circumflex, 60% stenosis of the first obtuse marginal, and plaquing of the right coronary artery. How would you code this patient?

a) Number of diseased vessels?   None   Single   Double   Triple
b) Left main %?   _____

24. A 61 year-old male underwent CABG. The coronary angiography report gave the following result: 60% stenosis of the left main, 50% stenosis of the left anterior descending, 70% stenosis of the second diagonal, 60% stenosis of the circumflex, and plaquing of the right coronary artery. How would you code this patient?

a) Disease - number vessels?   None   One   Two   Three

25. A 73 year-old female was admitted to the hospital for new onset angina and eventually underwent elective CABG. Following coronary angiography her creatinine increased from an admission level of 1.5 mg/dl to 2.5 mg/dl but then returned to a level of 1.6 mg/dl prior to CABG surgery. How would you record her creatinine?

a) Creatinine?   1.5 mg/dl   1.6 mg/dl   2.5 mg/dl   Other

26. A 77 year-old male underwent elective CABG for three vessel disease. The past medical history mentions "emphysema" with an FEV1 of 50% of predicted 6 months ago. The patient is not on metered dose inhalers, steroids, theophylline, or other pharmacotherapy for COPD. How would you code this patient?

a) Chronic Lung Disease ?   No   Mild   Moderate   Severe

27. A 60 year-old female underwent CABG for angina poorly controlled on medical therapy. The admitting history and physical states the patient is on atrovent inhalers and prednisone for the treatment of "chronic bronchitis." There is no documented FEV1. How would you code this patient?

   a) Chronic Lung disease? No   Mild   Moderate   Severe
   b) Immunosuppressive treatment?   Yes   No

28. A 76 year-old male underwent CABG for unstable angina. The chart documents a history of an abdominal aortic aneurysm repair in the past. How would you code this patient?

   a) Peripheral vascular disease?   Yes   No

29. 76 year-old male underwent CABG for unstable angina. The admitting note reports a history of claudication in his right calf upon walking more than one block. A right femoral-popliteal bypass operation had been planned but had not yet been performed. How would you code this patient?

   a) Peripheral vascular disease?   Yes   No

30. A 79 year-old male is admitted to the hospital with chest pain at rest and is found to have three vessel coronary disease and a depressed ejection fraction. A year earlier he had undergone right carotid endarterectomy for an asymptomatic stenosis of the right internal carotid artery. He underwent elective CABG. How would you code this patient?

   a) Cerebrovascular disease?   Yes   No
   a) Peripheral vascular disease?   Yes   No

31. A 79 year-old male is admitted to the hospital with chest pain at rest and is found to have three vessel coronary disease and a depressed ejection fraction. Two months earlier he had temporary loss of strength in his right arm and leg which resolved after 3 hours and which was diagnosed as a transient ischemic attack (TIA). He now undergoes elective CABG. How would you code this patient?

   a) Cerebrovascular disease?   Yes   No
   b) Peripheral vascular disease?   Yes   No

32. A 79 year-old male is admitted to the hospital with chest pain at rest and is found to have three vessel coronary disease and a depressed ejection fraction. Six months earlier he had suffered a stroke or cerebrovascular accident (CVA) with resulting left hemiparesis and partial aphasia. He now undergoes elective CABG. How would you code this patient?

   a) Cerebrovascular disease?   Yes   No
   b) Cerebrovascular accident?   Yes   No
   c) CVA timing   Recent   Remote
   d) Peripheral vascular disease?   Yes   No

33. A 56 year-old female with diabetes and hypertension undergoes elective CABG for three vessel disease with a normal ejection fraction. She is being treated with daily lasix and enalapril for "congestive heart failure." She currently has dyspnea with walking 1 to 2 blocks or up 1 flight of stairs, orthopnea, and a chest X-ray which is read as "cardiomegaly and mild pulmonary venous congestion". How would you code this patient?

    a) Congestive heart failure?   Yes   No
    b) NYHA Class?   I   II   III   IV

34. A 56 year-old female with diabetes and hypertension undergoes elective CABG for three vessel disease with a normal ejection fraction. She is being treated with daily lasix, hydralazine, and digoxin for "congestive heart failure." At the time of surgery, she has dyspnea at rest, orthopnea, ankle edema, and bibasilar rales felt due to mild pulmonary venous congestion. How would you code this patient?

    a) Congestive heart failure?   Yes   No
    b) NYHA Class?   I   II   III   IV

35. A 67 year-old male underwent elective CABG for left main disease with a depressed ejection fraction. In the two weeks before surgery, he had angina only with exertion, when he walked rapidly, walked up hills, or walked up two flights of stairs. How would you code this patient?

    a) Angina?   Yes   No
    b) Angina type?   Unstable   Stable
    c) CCS class?   0   I   II   III   IV

36. A 67 year-old male underwent elective CABG for left main disease with a normal ejection fraction. In the two weeks before surgery, his angina occurred only when he went on his daily 3 mile jog. How would you code this patient?

    a) Angina?   Yes   No
    b) Angina type?   Unstable   Stable
    c) CCS class?   0   I   II   III   IV

37. A 67 year-old male underwent elective CABG for left main disease with a depressed ejection fraction. In the week before surgery, his angina occurred with the most minimal activity such as walking to the bathroom but not at rest. How would you code this patient?

    a) Angina?   Yes   No
    b) Angina type?   Unstable   Stable
    c) CCS class?   0   I   II   III   IV

38. A 67 year-old male underwent elective CABG for left main disease with a depressed ejection fraction. In the two months before surgery, his angina

remained exertional, occurring when he walked at a normal pace one block on level ground or up the 5 steps to his porch. How would you code this patient?

a) Angina?   Yes   No
b) Angina type?   Unstable   Stable
c) CCS class?   0   I   II   III   IV

39.   A 70 year-old male underwent elective CABG. The left ventriculogram was read as showing an ejection fraction of 40-45% while an earlier preoperative echocardiogram reported an ejection fraction of 45% with moderate mitral regurgitation. How would you code the patient?

a) Ejection fraction?   ____%
b) Ejection fraction method?   LV gram ECHO Radionuclide Estimate
c) Mitral regurgitation?   None Trivial Mild Moderate Severe

40.   A 70 year-old male underwent elective CABG. The preoperative left ventriculogram was read as "ejection fraction normal" with "2+" mitral regurgitation. How would you code the patient?

a) Ejection fraction?   ____%
b) Ejection fraction method?   LV gram   ECHO   Radionuclide
c) Mitral regurgitation?   None Trivial Mild Moderate Severe

41.   A 70 year-old male underwent urgent CABG. The preoperative echocardiogram was read as an ejection fraction of 40-45% with a calculated ejection fraction of 47% and mild to moderate mitral regurgitation. An intraoperative transesophageal echocardiogram done at the beginning of surgery revealed an ejection fraction of 55% and trivial mitral regurgitation. A postoperative echocardiogram done the day after surgery showed an ejection fraction of 55% with no mitral regurgitation. How would you code the patient?

a) Ejection fraction?   ____%
b) Ejection fraction method?   LV gram ECHO Radionuclide Estimate
c) Mitral regurgitation?   None Trivial Mild Moderate Severe

42.   A 79 year-old female underwent elective CABG. The preoperative left ventriculogram was read as showing "a severely reduced ejection fraction." How would you code the patient?

a) Ejection fraction?   ____%

43.   A 73 year old female is admitted to the hospital for unstable angina. She has a history of a PTCA 3 years ago and CABG surgery 2 years ago in 1994. She is found to have an occluded bypass graft to the LAD and a tight stenosis of the proximal native LAD. She is taken for angioplasty (PTCA) of the native LAD but in attempting to pass the guide wire a dissection is

caused with threatened closure and the PTCA is aborted. She is taken directly from the cath lab to the operating room for CABG within 2 hrs.. How would you code this patient?

    a) No. of prior cardiac operations requiring cardiopulmonary bypass? _____
    b) PCI?   Yes   No
    c) PCI to surgery interval?   <6hrs   >6hrs
    d) Status?   Elective   Urgent   Emergent   Salvage

44. A 50 year old male is successfully treated in the emergency room with TPA one hour into an acute anterior myocardial infarction. He undergoes CABG 6 days later. The discharge diagnoses in the Discharge Summary include "aborted myocardial infarction". How would you code this patient?

    a) MI?   Yes   No
    b) When?   < 6 hrs   <24 hrs   1-7days   7-21 days   >21days

45. A 67 year old female is admitted with unstable angina. While in the hospital she has a syncopal episode while walking to the bathroom. She undergoes CABG 5 days later. How would you code this patient?

    a) Cerebrovascular disease?   Yes   No

46. An 71 year female undergoes CABG. She has a history of mitral valve replacement 20 years earlier for rheumatic heart disease. How would you code this patient?

    a) No. of prior cardiac operations requiring cardiopulmonary bypass? _____

47. A 49 year old male undergoes CABG. The admitting history and physical notes a history of adult onset diabetes. The patient is not on insulin or oral hypoglycemic agent. How would you code this patient?

    a) Diabetes?   Yes   No

48. A 66 year old female undergoes CABG. The chart records a history of hypertension though the patient is not on chronic antihypertensive medication. While in the hospital for the two days prior to surgery, her blood pressure is consistently over 150/100 and several time reaches 180/100 requiring treatment with sublingual nifedipine. How would you code this patient?

    a) Hypertension?   Yes   No

49. A 71 year old male undergoes evaluation for ECG changes which reveals three vessel disease and a reduced LVEF. He has never had anginal symptoms but undergoes CABG.   How would you code this patient?

    a) Angina?   Yes   No
    b) CCS Class?   0   I   II   III   IV

50. A 71 year old male undergoes evaluation for ECG changes which reveals three vessel disease and a reduced LVEF. He undergoes CABG.   He has had angina in the past but has not had anginal symptoms within 3 months and currently has no activity limitation.   How would you code this patient?

    a) Angina?   Yes   No
    b) CCS Class?   0   I   II   III   IV

51. A 64 year-old female undergoes CABG. The coronary angiography report gives the following result: mild stenosis of the left main, luminal irregularities of the left anterior descending (LAD), an 70% stenosis of the first diagonal, 80% stenosis of the second diagonal, a subtotal occlusion of the circumflex after giving off the first marginal, a 30% stenosis of the first obtuse marginal, and plaquing of the right coronary artery (RCA). At surgery, the patient has four coronary bypass grafts placed to the distal LAD, the first diagonal, the second obtuse marginal, and the right coronary artery. How would you code this patient?

    a) Number of diseased vessels?   None   Single   Double   Triple
    b) Left main disease _____%

Patient Vignette Answers

1. a) Status = **Urgent**. Although this patient might conceivably have been
        stabilized on medications, discharged, and operated on electively; his
        surgery prior to discharge from a hospitalization for rest angina qualifies
        as urgent under the revised STS definition.
    b) Angina = **Yes**.
    c) Angina type = **Unstable**. Classify anginal symptoms as unstable if they
        occur at rest (as in this patient).
    d) CCS class = **IV**. Rest symptoms are class IV.
    e) Number of diseased vessels = **Three.** The left main counts as LAD
        and circumflex and the RCA is > 50%
    f) Left main >50% = **Yes**.

2. a) Acuity = **Urgent**. This patient was operated on prior to discharge from an
        admission for worsened angina meeting the new STS definition for
        urgent. As a rule of thumb, elective patients can safely await surgery at
        home, urgent patients can safely await surgery but only by remaining in
        the hospital, and emergent patients cannot safely delay surgery even in
        the hospital.
    b) Angina = **Yes**.
    c) Angina type = **Unstable**. He did not have symptoms at rest but did have
        a < 2 week acceleration in his symptoms of at least one CCS class to at
        least class III severity.
    d) CCS class = **IV**. Rest symptoms or symptoms with very minimal exertion
        are CCS class IV. Symptoms occurring with walking at a normal pace
        one to two blocks or one flight of stairs is class III.
    e) Number of diseased vessels = **Two.** Left main counts as LAD and
        circumflex but the RCA is only "plaqued" (< 50%).
    f) Left main % **= 60%** ($\geq$ 50% = **Yes)**

3. a) Status = **Urgent**. She decompensated and became critically ill due to
        renal failure following her angiography and was intubated for pulmonary
        edema. Patients operated on *while* intubated for pulmonary edema are
        emergent per the STS; however, this patient was stabilized medically
        and extubated by the time of CABG.
    b) Angina = **Yes**.
    c) Angina type = **Unstable.** Chest pain at rest.
    d) CCS class = **IV**. Angina and CCS class are coded on the basis of
        presenting symptoms independent of whether the patient rules in for a
        myocardial infarction.
    e) CHF = **Yes.**
    f) NYHA class = **IV.** Symptoms at rest.
    g) MI = **Yes**. Ruled in for subendocardial infarction.
    h) MI when = **7-21d.**

     i) Cardiogenic shock = **No.** Neither intubation for pulmonary edema (in the absence of hypotension or low output) nor low-dose dopamine for diuresis meet criteria for shock.

     j) Creatinine = **1.6** *Last* creatinine prior to surgery.

     k) COPD = **Severe.** Most coders consider home oxygen confirmation of the diagnosis of COPD even though it is not mentioned by the STS; room air pO2 is assumed to be < 60 mmHg in these cases.

     l) Hepatic failure = **No.** No history of liver disease despite abnormal albumin.

4.   a) Status = **Elective**. The presence of left main disease alone is not enough to warrant urgent status in this patient who presented with two months of stable exertional symptoms. Had she presented with unstable angina and left main disease, urgent status may have been indicated. Although in this case CABG was performed on the same hospitalization as the catheterization, the patient could also have been operated on as an outpatient.

     b) Angina = **Yes**

     c) Angina type = **Stable**

     d) CCS class = **Probably II or III** (given that she went 8 minutes on her stress test), although we are not told what level of exertion precipitated symptoms.

     e) Number of diseased vessels = **Three.** Left main counts as LAD and circumflex and RCA is diseased.

5.   a) Status = **Urgent**. The patient's recurrent ischemia did not respond to drug therapy but did resolve with the placement of an intra-aortic balloon pump. The intra-aortic balloon pump by itself is not sufficient to classify this patient as emergent. If the patient's symptoms had continued *despite* the IABP and the patient had been taken to surgery the same day, the operation would have been emergent (see STS urgent criteria D and emergent criteria A).

     b) Angina = **Yes**.

     c) Angina type = **Unstable**. Angina at rest.

     d) CCS class = **IV**. Rest symptoms are class IV.

6.   a) Status = **Emergent**. The myocardial infarction > 24 hrs prior to CABG does not meet emergent criteria. However, this patient's unstable anginal symptoms persisted and were ongoing up until surgery despite maximal medical therapy. The surgery was required within a few hours and warrants emergent status.

     b) Angina = **Yes**.

     c) Angina type = **Unstable**. Rest symptoms

     d) CCS class = **IV**.

     e) MI = **Yes**

     f) When (MI) = **1-7 days**

7. a) Status = **Urgent**. This patient presented with new onset anginal symptoms and CHF and underwent CABG during the same hospitalization (STS urgent criteria C & D)
    b) Angina = **Yes**.
    c) Angina type = **Unstable**
    d) CCS class = **IV**
    e) CHF = **Yes**
    f) NYHA class = **IV**. This patient had CHF symptoms at rest within two weeks of her surgery and thus is class IV.

8. a) Status = **Urgent**. This patient's unstable angina recurred on medical therapy and he was operated on two days later warranting urgent status.
    b) Angina = **Yes**.
    c) Angina type = **Unstable**. Rest symptoms
    d) CCS class = **IV**
    e) CHF = **No**. No history or current symptoms of heart failure.
    f) NYHA = **IV (for angina).** CHF symptoms would be **class = I.** Note: unlike CCS class, there is no "class 0 for NYHA so patients with no symptoms are class I.
    g) MI = **No**. He was "ruled out".

9. a) Status = **Urgent**. This patient had unstable angina which resulted in a malignant arrhythmia and would thus be urgent.
    b) Angina = **Yes**.
    c) Angina type = **Unstable**. Rest symptoms
    d) CCS class = **IV.**
    e) MI = **No**. He was "ruled out".
    f) CHF = **No**
    g) NYHA = **IV (for angina)**. He presumably has no history of CHF (none is given), thus he is CHF symptoms would be class I.
    h) Arrhythmia = **Yes**. Arrhythmia type = **Sustained VT/VF.** He had VF requiring treatment within two weeks of his surgery. He also had Afib, but choose VT/VF since this is a risk factor for CABG while Afib is not.

10. a) Status = **Urgent**. This patient had post infarction angina following TPA warranting urgent status
    b) Angina = **Yes**.
    c) Angina type = **Unstable**. Rest symptoms
    d) CCS class = **IV**
    e) CHF = **No**.
    f) NYHA = **IV (for angina)**. She had no history of CHF so CHF would be class I.
    g) MI = **Yes**.
    h) Arrhythmia = **Yes**. Arrhythmia type = **Sustained VT/VF.** She had sustained VT requiring cardioversion within 2 weeks of surgery.

11. a) Status = **Emergent**. The patient was in cardiogenic shock at the time of surgery due to a myocardial infarction 5 days earlier. Patient in shock at the time of surgery (with or without circulatory support) are classified as emergent.
     b) Angina = **Yes**.
     c) Angina type = **Unstable**. Rest chest pain within two weeks of the surgery
     d) CCS class = **IV**
     e) CHF = **Yes**. Although in this exercise we do not provide a detailed enough patient history to fully document CHF, cardiogenic shock certainly warrants this diagnosis
     f) NYHA = **IV (both angina and CHF are class IV).**
     g) MI = **Yes**.
     h) MI when = 1-7 days.

12. a) Cerebrovascular disease = **Yes**. In addition to TIA, RIND, and stroke, the revised STS definition classifies asymptomatic carotid stenoses of >75% as cerebrovascular disease.
     b)   Cerebrovascular accident = **No.**
     c)   CVA timing? < or > 2 weeks = **N/A - Missing**
     b) Peripheral vascular disease = **No**. Peripheral vascular disease does not include cerebral vascular disease. Peripheral vascular disease is coded if the patient has claudication, diminished femoral pulses, a history of an aortic aneurysm, stenosis of the aortic, iliac, femoral, or popliteal vessels, or surgery for such a stenosis.

13. a) Congestive heart failure (CHF) = **No**. The patient has a history of CHF 2 years ago but has had no CHF symptoms within two weeks of surgery.
     b) NYHA = **Class II (for angina)**. CHF would be class I. Patients without CHF and patients with minimal CHF symptoms are coded as class I.

14. a) CHF = **No**. The patient has had no symptoms or signs of CHF within two weeks of surgery though she is on CHF medications.
     b) NYHA = **Class III (for angina)**. CHF would be class I (asymptomatic).

15. a) Angina = **No.**
     b) CCS class = **0.** No angina.
     c) CHF = **Yes**. She has a history of CHF and currently has STS criteria including dyspnea on exertion and PND.
     d) NYHA = **Class II**. Ordinary activity results in symptoms.

16. a) CHF = **Yes**. She has a history of CHF and currently has STS criteria - dyspnea and pulmonary edema on chest X-ray.
     b) NYHA = **Class III**. Less than ordinary activity results in symptoms.

17. a) Arrhythmia = **No**. The patient had only asymptomatic and relatively brief runs of *non-sustained* ventricular tachycardia. Non-sustained (< 30 seconds) ventricular tachycardia is not classified as a ventricular arrhythmia.

18. a) Arrhythmia = **No**. Although this patient was treated with an intravenous antiarrhythmic agent, did not have *sustained* ventricular tachycardia or fibrillation but rather only PVC's (premature ventricular beats) and non-sustained VT. Thus, he would not be classified as having a ventricular arrhythmia. The lidocaine was arguably unnecessary in this case.

19. a) Arrhythmia = **Yes**. Arrhythmia type = **Sustained VT/VF**. Sustained ventricular is generally accepted as greater than 30 seconds. When both a sustained ventricular and another type of arrhythmia are present, code the ventricular arrhythmia. Most cases of ventricular fibrillation will require treatment and will qualify as a ventricular arrhythmia by STS criteria.

20. a) Arrhythmia = **No**. The patient's episode of ventricular tachycardia did not occur within 2 weeks prior to CABG, which is the time window to which this variable refers.

21. a) COPD = **No**. Merely being labeled as having "COPD" in the chart is not sufficient. there must be documentation of therapy with bronchodilators, theophylline, steroids, or home O_2, or of an FEV1 <75% of predicted. Of note, short term use of inhaled bronchodilators because of "cardiac asthma" or pulmonary infection similarly is not sufficient to classify a patient with COPD.

22. a) Number of vessels = **Three**. When the posterior descending coronary artery (PDA) comes off of the circumflex instead of the right coronary artery (referred to as a left dominant system), the PDA is counted as a separate vessel and the non-dominant right coronary is generally not counted.

23. a) Number of vessels = **Two**. Although four different vessels and branches are noted to have >50% stenoses, only two of the three major coronary artery systems (the LAD and Cx but not the RCA) are involved. If multiple branches of the same artery are diseased, they are counted as a single vessel. Plaquing refers to mild stenoses well less than 50%.
    b) Left main % = **40%** ($\geq$ 50% = **No)**.

24. a) Number of vessels = **Two**. Many clinicians consider significant coronary stenoses to be those that are $\geq$ 70-75%. However, for the purposes of the STS and the CCORP, stenoses or narrowing $\geq$ 50% are counted.

Thus, in this patient the 50% narrowing of the LAD count as LAD disease while the circumflex stenosis of 60% counts as circumflex disease. The 60% stenosis of the left main also counts as disease of the LAD and circumflex. However, do not double count the LAD and circumflex.

b) Left main disease % = **60%** ($\geq$ 50% = **Yes)**.

25. a) Creatinine = **1.6 mg/dl**. The *last* creatinine determination *prior* to CABG should be entered, in this case 1.6 mg/dl.

26. a) Chronic lung disease = **Moderate**. An FEV1 50 to 59% of predicted, even in the absence of pharmacological therapy, is coded as moderate COPD. FEV1 <50% predicted would be severe COPD.

27. a) Chronic lung disease = **Moderate**. Chronic bronchitis and emphysema are types of COPD and thus this patient who is on chronic steroid therapy should be classified as moderate COPD. Had he been on bronchodilators without steroids, it would have been mild COPD.

b) Immunosuppressive treatment? = **Yes** (Prednisone).

28. a) Peripheral vascular disease = **Yes**. Peripheral vascular disease is coded if the patient has a history of an aortic aneurysm (as in this patient), stenosis of the aortic, iliac, femoral, or popliteal vessels, or surgery for such a stenosis.

29. a) Peripheral vascular disease = **Yes**. Peripheral vascular disease is coded if the patient has had <u>claudication</u> (as in this patient).

30. a) Cerebrovascular disease = **Yes**. The new STS definition includes asymptomatic carotid stenoses >75% but does not explicitly mention a history of carotid endarterectomy (CEA). However, since such surgeries are generally performed only for asymptomatic stenoses > 75% or for symptoms, it is reasonable to assume a patient status post CEA meets criteria for cerebrovascular disease.

b) Peripheral vascular disease = **No**. Cerebrovascular disease is not included in peripheral vascular disease. No other history of peripheral vascular disease is given.

31. a) Cerebrovascular disease = **Yes**. A history of transient ischemic attack (TIA) is coded as cerebrovascular disease.

b) Peripheral vascular disease = **No**. Cerebrovascular disease is not coded as peripheral vascular disease.

32. a) Cerebrovascular disease = **Yes**. Strokes are coded as cerebrovascular disease.
    k) Cerebrovascular accident = **Yes.** CVA ever is coded as yes.
    l) CVA timing = **Remote (> 2 weeks).** Recent is ≤ 2 weeks.
    m) Peripheral vascular disease = **No**. Cerebrovascular disease is not coded as peripheral vascular disease.

33. a) Congestive heart failure = **Yes**. This patient is currently symptomatic and has pulmonary congestion on chest X-ray and thus is coded as having CHF.
    b) NYHA class = III. Assigning NYHA class is always a matter of some judgment but based on the limited information provided the patient has dyspnea with less than normal activities and thus is class III.

34. a) Congestive heart failure = **Yes**. This patient has dyspnea at rest, edema, and rales.
    b) NYHA class = **IV**. Rest symptoms are class IV.

35. a) Angina = **Yes**
    b) Angina type = **Stable**
    c) CCS class = **II**. He has slight limitation of normal activities and ordinary activities such as walking up several flights of stairs or walking uphill can bring on his anginal symptoms.

36. a) Angina = **Yes**
    b) Angina type = **Stable**
    c) CCS class = **I**. Ordinary activities do not precipitate his angina. Only strenuous activities, in this case jogging, cause symptoms. Patients without angina (i.e., asymptomatic) are also coded class I.

37. a) Angina = **Yes**
    b) Angina type = S**table**. Exertional chest pain which did not require treatment in an ICU or IV NTG.
    c) CCS class = **IV**. The patient cannot carry out any activities without symptoms and should be coded with CCS class IV angina. Patients with symptoms at rest are also coded class IV.

38. a) Angina = **Yes**
    b) Angina type = **Stable**. Exertional chest pain.
    c) CCS class = **III**. The patient's activities are markedly limited and he should be coded class III.

39. a) Ejection fraction = **42%**. For the left ventriculogram the range 40-45% averages to 42.5%, so enter 42%. For the echocardiogram, enter 45%.
    b) Ejection fraction method = **LV gram or echo**. Most recent study is preferred.
    c) Mitral regurgitation = **Moderate**. The MR is on the echocardiogram.

40. a) Ejection fraction = **65%**. When the EF is described qualitatively it should be coded as follows: normal = 65%, mildly reduced = 50%, moderately reduced = 35%, and severely reduced = 20%.
    b) Ejection fraction method = **LV gram**.
    c) Mitral regurgitation = **2**.

41. a) Ejection fraction = **47% (calculated) or 42% (visually estimated)**. Most patients will have ejection fractions reported from pre-operative left ventriculograms. This patient, perhaps because he was unstable (urgent status) had only an echocardiogram. The echo reported both a visually estimated EF range and a calculated value. Intraoperative and post-operative echos should not be used.
    b) Ejection fraction method = **ECHO** (*pre-operative)*. The intra-operative transesophageal echocardiogram (TEE), although done at the beginning of surgery, should not be used because general anesthesia can alter EF and MR and the determination of EF and MR by TEE is less standardized and, even under identical conditions, can obtain results which differ from standard transthoracic echo. The post-operative echos are never used since they can reflect the benefits of surgery rather than the patient's pre-operative state.
    c) Mitral regurgitation = **Moderate**. MR from the pre-operative echo should be entered as the higher of the two values (mild to moderate).

42. a) Ejection fraction = **20%**. When the EF is described qualitatively it should be coded as follows: normal = 65%, mildly reduced = 50%, moderately reduced = 35%, and severely reduced =20%.

43. a) Number of prior heart operations requiring cardiopulmonary bypass = **1**. The CABG two years ago. valve replacements and most other cardiac surgeries would also be counted here.
    b) PCI = **Yes**. Even though the PTCA was aborted, any patient in whom the procedure is attempted should be coded as having a PCI.
    c) PCI to surgery time interval = **< 6 hrs**.
    c) Status = **Emergent**. Generally, patients with failed PTCA's taken immediately to CABG are coded as emergent because they have ongoing ischemia requiring immediate surgery.

44. a) MI (myocardial infarction) = **Yes**. Even though his MI was successfully interrupted by thrombolysis with TPA, he should be coded as having had an MI.
    b) When = **1-7 days**.

45. a) Cerebrovascular disease = **No**. "Syncopal episode" refers to loss of consciousness, also called a fainting episode. It should not be confused with a transient ischemic attack (TIA), which is a transient stroke and rarely causes fainting. Syncope is not coded as cerebrovascular disease while a TIA would be.

46. a) Number of prior cardiac operations requiring cardiopulmonary bypass = **One**. All cardiac operations requiring cardiopulmonary bypass, not just CABG's, are counted here.

47. a) Diabetes = **Yes**. Patients are coded with diabetes regardless duration of the disease, the need for treatment with insulin or oral antidiabetic agents (e.g., glyburide, glypizide, micronase), or the presence of diabetic complications. Thus, any history of diabetes is coded as yes.

48. a) Hypertension = **Yes**. Documented history of hypertension, the need for anti-hypertensive medication, or blood pressure consistently exceeding 140/90 is coded as hypertension.

49. a) Angina = **No.**
    b) CCS class = **0.** Patients without angina are always class 0, which may be coded by the number "1" in some software programs. Patients with angina at some time but with mild or no symptoms currently are class I.

50. a) Angina = **Yes.** Most coders assign yes if the patient has ever had angina.
    b) CCS class = **I.** Class 0 is reserved for no angina. Thus patients with a history of angina but with mild or no symptoms around the time of their surgery are class I.

51. a) Number of diseased vessels = **Two**. The luminal irregularities in the LAD and the plaquing of the right coronary artery should be interpreted as a < 50% stenoses and not counted. However, the LAD system is diseased because the first and second diagonals have >50% stenoses. The "subtotal occlusion" of the circumflex implies a very tight stenosis (95-99%) thus this is the second diseased vessel. The first obtuse marginal branching off of the circumflex is < 50% stenosed and would not be counted but as discussed the circumflex itself is diseased. The fact that four grafts were placed, including one to the RCA which was not counted as diseased, does not influence the coding of the number of diseased vessels. In some cases, vessels with mild disease are bypassed.
    b) Left main % = **20% ($\geq$ 50% = No)**. The mild stenosis should be interpreted as less than 50.